UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,127	07/18/2003	Konstantin V. Rodyushkin	10559-831001	4494

20985 7590 03/27/2007	EXAMINER	
FISH & RICHARDSON, PC	LE, BRIAN Q	
P.O. BOX 1022	ART UNIT	PAPER NUMBER
MINNEAPOLIS, MN 55440-1022	2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

	Application No.	Applicant(s)
Office Action Summary	10/623,127	RODYUSHKIN ET AL.
	Examiner	Art Unit
	Brian Q. Le	2624

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☒ Claim(s) *30-32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date *07/18/2003*.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Claim Rejections - 35 USC § 101

1.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2.   The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

3.   Claim(s) 18-26 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows.

Claim 18 recites "A computer program product, tangibly embodied in an information carrier, for defining a deformable model for facial recognition, the computer ..." embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the

function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of

the presently claimed "an information carrier" (lines 1-2 of claim 18) can range from paper on

which the program is written, to a program simply contemplated and memorized by a person.

The examiner suggests amending the claim to embody the program on "computer-readable

medium" or equivalent in order to make the claim statutory. Any amendment to the claim

should be commensurate with its corresponding disclosure.

Claims not specifically addressed are rejected because they are dependent of the rejected

claims.

Claim Objections

4.   Claims 30-32 are objected to because of the following informalities: The Applicant

needs to define what are T, $I(x,y)$; and $\min_T$ of the energy function in order for one skilled in the

art to make sense out of the function. The prior art rejection based on the Examiner's best

understanding. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6.   Claims 1-11, 16-20 and 25-29 are rejected under 35 U.S.C. 102(e) as being anticipated by

Tian et al. U.S. Patent No. 6,879,709.

Regarding claim 1, Tian teaches a medium bearing a deformable model (detect an

expression of the face by using model to detect the changes of facial images by the process of

normalization since normalization is known to compensate changes and variance of position,

pose, scale and illumination) (abstract; column 9, lines 20-25; FIG. 13; and column 1, line 63 to

column 2, line 4) configured to enable a machine to estimate positions of four points (detect

position of six points) (column 8, line 29-40) defined by X and Y coordinates (column 13, lines

1-4), each of the points representing a facial element position (column 13, lines 5-15) in a digital

image (abstract, 2nd line).

For claim 2, Tian also teaches the medium bearing a deformable model in which the four

points include a first point designating a center of a left eye (column 13, line 47).

Regarding claim 3, Tian further teaches the medium bearing a deformable model in

which four points further include a second point designating a center of a right eye (column 13,

lines 47-48).

Referring to claim 4, Tian discloses the medium bearing a deformable model in which the

four points further include a third point designating a left corner of the mouth (column 9, line

27).

Referring to claim 5, Tian discloses the medium bearing a deformable model in which the

four points further include a fourth point designating a left corner of the mouth (column 9, lines

27-28).

For claim 6, Tian shows the medium bearing a deformable model comprising a variable representing a distance between the first and second points (distance between face characteristic points would include distance between the first and the second points) (column 8, lines 45-48).

Regarding claim 7, Tian further shows the medium bearing a deformable model further comprising a variable representing a distance between the third and the fourth points (distance between face characteristic points would include distance between the third and the fourth points) (column 8, lines 45-48).

For claim 8, Tian teaches the medium bearing a deformable model further comprising a variable representing a distance between eyes and mouth (column 9, lines 25-30).

Regarding claim 9, Tian teaches a method comprising:

Estimating deformable models (detect an expression of the face by using model to detect the changes of facial images by the process of normalization since normalization is known to compensate changes and variance of position, pose, scale and illumination) (abstract; column 9, lines 20-25; FIG. 13; and column 1, line 63 to column 2, line 4) including eye positions (FIG. 6) and mouth positions (FIG. 6 and FIG. 7A) on each from of a digital image sequence (abstract).

For claim 10, Tian teaches the method in which estimating comprises matching a current face formable model with image features (authentication requires matching/comparing) (column 10, lines 32-35 and column 16, lines 39-45).

For claim 11, Tian further teaches the method in which the eye positions and the mouth positions are represented by four points defined by x and y coordinates (column 13, lines 1-4; FIG. 5B and FIG. 6).

Regarding claim 16, Tian teaches the method in which the four points of the current face deformable model are determined by six parameters (distance's parameters and histogram's parameters) (column 13, lines 20-44) and a base face model (column 13, lines 45-47).

Referring to claim 17, Tian teaches the method of in which the six parameters comprise:

a first parameter representing a distance increase between eyes (distance between left and right eyes) (column 12, lines 60-67);

a second parameter representing a distance increase between eyes and mouth (column 13, lines 25-28);

a third parameter representing a distance increase between mouth corners (column 13, lines 30-33);

a fourth parameter representing a rotation angle (column 13, lines 60-67);

a fifth parameter representing a shift value along an X axis (L or N) (FIG. 6);

a sixth parameter representing a shift value along a Y axis (M or K) (FIG. 6).

Regarding claim 18, please refer back to claim 9 for further teachings and explanations. In addition, Tian teaches a computer program product (column 7, lines 57-60) to perform the aforementioned limitations.

For claims 19-20, please refer back to claims 10-11 respectively for further teachings and explanations.

For claims 25-26, please refer back to claims 16-17 for further teachings and explanations.

For claim 27, Tian teaches a method comprising:

Receiving a first digital image in a sequence of digital images (FIG. 4, element 410) and

eye and mouth coordinates (FIG. 5B);

Outputting (column 12, lines 5-10) eye and mouth coordinates on a subsequent digital

image in the sequence of digital images (FIG. 6).

For claim 28, Tian further teaches the method in which receiving further comprises

estimating a base face model and the base face model's transformation parameters T' by the eye

and mouth coordinates (transform characteristic points of a face would include transformation

parameters of the eye and the mouth coordinates) (column 12, lines 40-56).

Regarding claim 29, Tian also teaches the method in which outputting comprises:

Calculating an initial model M as a transformed base model M_b using transformation

parameters T' (that is the concept of transformation process) (column 5, lines 34-38 and column

12, lines 55-56);

Rotating the subsequent image to I(x, y) to generate a normalized model M (column 13,

line 55 to column 14, line 8).

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

8.   Claims 12-15 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Tian et al. U.S. Patent No. 6,879,709.

Regarding claims 12-15, Tian teaches the method which the four points comprise a first point, second point, third point and fourth point to designate left eye center, right eye center, left mouth, and right mouth and uses labeling technique as Pn (P1, P2, P3 and P4) to label each point (FIG. 5B). Tian does not explicitly use the labeling system i = 1, i = 2, i = 3, and i = 4. However, it would have been obvious to use also use Pn system or I = n system to label each region of the image for better recognition each region of the image in order to help the system to automatically label facial expressions and facilitating retrieval base on facial expressions (column 7, lines 60-64). This would improve processing and therefore, it would have been obvious to one of the ordinary skill in the art to modify Tian to implement a labeling method.

For claims 21-24, please refer back to claims 12-15 respectively for further teachings and explanations.

Allowable Subject Matter

9.   Claims 30-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and overcome the objection of the claims.

CONCLUSION

10.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to facial matching and position estimation:

U.S. Pat. No. 6,934,406 to Nakano, teaches image processing to process image taking into consideration difference in image pickup condition.

U.S. Pat. No. 6,088,040 to Oda et al., teaches method of facial image conversion by interpolation/extrapolation.

U.S. Pat. No. 5,450,504 to Calia, teaches method for finding a most likely matching of a target facial image in data base of facial images.

11.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Q. Le whose telephone number is 571-272-7424. The examiner can normally be reached on 8:30 A.M - 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian Le
March 21, 2007